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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,556	10/23/2003	Moshe Hershkovich	2694/24	6413

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EXAMINER

FLEURANTIN, JEAN B

ART UNIT	PAPER NUMBER
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2162

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/690,556	<b>Applicant(s)</b> HERSHKOVICH ET AL.	
	<b>Examiner</b> JEAN B. FLEURANTIN	<b>Art Unit</b> 2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>04/05/04</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This in response to the application filed on 10/23/03, in which claims 1-39 are presented for examination.

#### ***Information Disclosure Statement***

2. The information disclosure statement (IDS) submitted on 04/05/04. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

#### ***Drawings***

3. The Drawings submitted 10/23/03 are acknowledged.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2002/0007446 issued to Stark ("Stark") in view of "Algorithms in C++" - pages 231-243, Addison Wesley, Reading Mass (1992) issued to Sedgewick, submitted by the Applicant(s), ("Sedgewick").

As per claim 1, Stark discloses "a computer-implemented method of searching" (see paragraph [0036]) "an ordered database" (i.e., an ordered set of storage (database); see paragraph [0054], line 1) the method comprising the steps of:

- (a) providing a system (see Fig. 6 and paragraph [0252]) including:

"(i) a memory for storing a plurality of key entries" (i.e., an ordered set of memory cells for storing entries; see paragraph [0084], lines 1-2); and

(B) "searching said coded entries" (i.e., conducting a key (code) search; paragraph [0024], lines 1-3); and

"(c) performing a deterministic search in at least one data structure within said memory to obtain a match between an input key" (In light the specification at page 3, line 22 to page 4, line 5, the purpose of performing deterministic search is for obtaining a match between an input key and a key entry. The method for associating data values are extracted from memory upon conducting a key search on the associative key data is disclosed by Stark page 3, paragraph [0028]) and "a key entry of said key entries" (see paragraph [0258]).

Stark fails to explicitly disclose processing logic for using transformed key entries transforming said key entries into coded entries, and (b) performing a pre-determined transformation of each key entry of said plurality of key entries so as to obtain a plurality of coded entries. However, Sedgewick discloses transformed key entries transforming said key entries into coded entries, and (b) performing a pre-determined transformation of each key entry of said plurality of key entries so as to obtain a plurality of coded entries (see Sedgewick page 232, paragraphs 1 and 2).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Stark by processing logic for transforming said key entries into coded entries, and (b) performing a pre-determined transformation of each key entry of said plurality of key entries so as to obtain a plurality of coded entries as disclosed by Sedgewick (see Sedgewick page 232, lines 4-10). Such a modification would allow the teachings of Stark to provide efficient use of available memory and fast access to the memory are prime concerns of any hashing method (see Sedgewick page 231, paragraph 3, line 57), thereby improving the accuracy of the search method using coded keys.

As per claim 2, Stark discloses "said search is deterministic with respect to specific key data" (i.e., conducting a key search on the associative key data; see paragraph [0028]).

As per claim 3, Stark discloses "said specific key data includes said input key" (i.e., an ordered set of k-bit inputs; see paragraph [0090]).

As per claim 4, Stark discloses "said specific key data includes said key entries" (i.e., a k-bit key input for inputting; see paragraph [0088]).

As per claim 5, Stark discloses "said specific key data includes said coded entries in said data structure" (i.e., the entry comprises a k-bit value; see paragraph [0084]).

As per claim 6, in addition to claim 1, Stark discloses "said search is deterministic with respect to a required amount of auxiliary data" (see paragraph [0059]).

As per claim 7, Stark discloses "said search is a pre-determined search" (i.e., conducting a search; see paragraph [0024]).

As per claim 8, Stark discloses, in addition to claim 1, "includes information relating to at least one different key entry of said key entries" (see paragraph [0273]).

As per claim 9, Stark discloses "said at least one different key entry is a single key entry" (i.e., receiving an input key; see paragraph [0028]).

As per claim 10, Stark discloses "said information includes positional information" (i.e., position of the boundary values (information); see paragraph [0207]).

As per claim 11, Stark discloses "said information includes information resulting from at least one varying bit" (i.e., boundary type of information, representing by a bit; see paragraph [0051]).

As per claim 12, Stark discloses "said at least one varying bit includes a most significant bit" (i.e., bit indicates whether the boundary values is opened or closed; see paragraph [0051]).

As per claim 13, the limitations of claim 13 are rejected in the analysis of claim 1, and this claim is rejected on that basis.

As per claim 14, Stark discloses "said performing of said deterministic search includes: (i) processing said coded keys to determine a required set of auxiliary data, said set being required to proceed with said search" (i.e., conducting a key (code) search; paragraph [0024], lines 1-3), and

"(ii) using said required set of auxiliary data for an additional processing of said coded keys so as to determine a result of said search" (i.e., associated data values are extracted from memory upon conducting a key search on the associative key data; see page 3, paragraph [0028]).

As per claim 15, Stark discloses "said auxiliary data includes a portion of a key entry" (see paragraph [0062]), and "wherein said portion is then compared to said input key" (see paragraph [0070]).

As per claim 16, Stark discloses "said search is an exact search, and wherein said performing of said deterministic search includes: (i) processing said coded keys to determine a required set of auxiliary data, said set being required to proceed with said search" (i.e., conducting a key (code) search; paragraph [0024], lines 1-3), and

"(ii) comparing said set with said input key to determine a result of said search" (i.e., associating (comparing) data values are extracted from memory upon conducting a key search on the associative key data; see page 3, paragraph [0028]).

As per claim 17, Stark discloses "a certain match exists between said input key" (see paragraph [0028]) and "a key entry of said plurality of key entries" (see paragraph [0272], lines 1-3), and "wherein

said deterministic search is performed solely by processing of said coded keys" (i.e., conducting a key (code) search; paragraph [0024], lines 1-3).

As per claim 18, Stark further discloses "storing said plurality of key entries in a particular order" (i.e., entries must be stored in a sequential order (particular order); see paragraph [0292]).

As per claim 19, Stark discloses "said particular order is a monotonic order" (i.e., an ordered set; paragraph [0054]).

As per claim 20, the limitations of claim 20 are rejected in the analysis of claim 1, and this claim is rejected on that basis.

As per claim 21, in addition to claim 1, Stark further discloses "(d) so as to obtain a match between an input key and a key entry of said key entries" (i.e., input key is contained in one or more associative elements, the associated data that corresponds to the associative element that contains the input key; see paragraph [0024]).

Stark fails to explicitly disclose performing a deterministic search within said at least one node of said search-tree structure. However, Sedgewick discloses (In light the specification at page 27, lines 1-21, the purpose of searching B-tree is for performing a deterministic search within said at least one node of said search-tree structure; see Sedgewick page 236, lines 13-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Stark by performing a deterministic search within said at least one node of said search-tree structure as disclosed by Sedgewick (see Sedgewick page 243, last paragraph). Such a modification would allow the teachings of Stark to provide very fast searching times, binary tree structures have the advantages that they are dynamic (see Sedgewick page 243, last paragraph, lines 2-4), thereby improving the accuracy of the search method using coded keys.

As per claim 22, Stark discloses, in addition to claim 1, "relating to at least one different key entry of said key entries" (see paragraph [0273]).

As per claim 23, Stark discloses, in addition to claim 1 "a first coded entry of said coded entries includes positional information relating to a first different key entry, and wherein a second coded entry of said coded entries includes positional information relating to a second different key entry" (see paragraphs [0207 and 0092-0093]).

As per claim 24, in addition to claim 1, Stark further discloses "includes positional information" (i.e., position of the boundary values (information) on the integer number axis; see paragraph [0207]) "relating to a different respective key entry" (see paragraphs [0092 - 0093]).

As per claim 25, the limitations of claim 25 are rejected in the analysis of claim 1, and this claim is rejected on that basis.

As per claim 26, the limitations of claim 26 are rejected in the analysis of claim 1, and this claim is rejected on that basis.

As per claim 27, the limitations of claim 27 are rejected in the analysis of claim 1, and this claim is rejected on that basis.

As per claim 28, Stark discloses "said auxiliary data includes at least a portion of a key entry of said key entries" (see paragraph [0258]).

As per claim 29, Stark discloses "a size of said auxiliary data equals less than half of a size of said key entries" (i.e., K (data) value equals less than; see paragraph [0244]).



As per claim 30, Stark discloses "said auxiliary data is a portion of a single key entry" (see paragraph [0093]).

As per claim 31, in addition to claims 1 and 21, Stark further discloses "includes information resulting from at least one varying bit" (see paragraph [0093]).

As per claim 32, Stark discloses "said at least one varying bit includes a most significant bit" (i.e., bit indicates whether the boundary values is opened or closed; see paragraph [0051]).

As per claim 33, Stark discloses "said search is deterministic with respect to specific key data" (i.e., conducting a key search on the associative key data; see paragraph [0028]).

As per claim 34, Stark discloses "said specific key data includes said input key" (i.e., an ordered set of k-bit inputs; see paragraph [0090]).

As per claim 35, Stark discloses "said specific key data includes said key entries" (i.e., a k-bit key input for inputting; see paragraph [0088]).

As per claim 36, Stark discloses "said specific key data includes said coded entries in said data structure" (see paragraph [0084]).

As per claim 37, Stark discloses "said search is deterministic (see paragraph [0028]) with respect to a required amount of auxiliary data" (see paragraph [0059]).

As per claim 38, Stark discloses "said search is a pre-determined search" (i.e., conducting a search; see paragraph [0024]).

As per claim 39, in addition to claim 1, Stark further discloses "(d) each of said matches representing a match between a particular, respective input key and a particular key entry of said key entries" (i.e., input key is contained in one or more associative elements, the associated data that corresponds (matched) to the associative element that contains the input key; see paragraph [0024]).

Stark fails to explicitly disclose performing a pipelined search within said search-tree structure so as to obtain a plurality of matches. However, Sedgewick discloses (In light the specification at page 27, lines 1-21, the purpose of searching B-tree is for performing a pipelined search within said search-tree structure; see Sedgewick page 236, lines 13-17).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Stark by performing a pipelined search within said search-tree structure as disclosed by Sedgewick (see Sedgewick page 243, last paragraph). Such a modification would allow the teachings of Stark to provide very fast searching times, binary tree structures have the advantages that they are dynamic (see Sedgewick page 243, last paragraph, lines 2-4), thereby improving the accuracy of the search method using coded keys.

#### ***Prior Art***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.  
Stark, U.S. Patent No. 6,633,953 relates to field content addressable memory (CAM).

#### CONTACT INFORMATION

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEAN B. FLEURANTIN whose telephone number is 571 – 272-4035. The examiner can normally be reached on 7:05 to 4:35.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 571 – 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jean Bolte Fleurantin

Patent Examiner

Technology Center 2100

May 19, 2006